

REMARKS

Applicants submit this Reply in response to the non-final Office Action mailed November 21, 2007. Claims 29-43 and 49-56 are currently pending, of which claim 29 is independent. Applicants have amended claims 29 and 31 and withdrawn the non-elected claims 44 and 45. Applicants respectfully request reconsideration of the application, as presently amended.

In the non-final Office Action dated November 21, 2007, the Examiner maintained the restriction requirement of claims 44 and 45, and further restricted claims 46-48. The Examiner rejected claims 29-36, 38-40, 43, and 50-56 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,310,716 ("Evans et al.") in view of U.S. Patent Application Publication No. 2002/0080474 ("Ohishi et al."). The Examiner rejected claims 37 and 41-43 under 35 U.S.C. § 103(a) as being unpatentable over Evans et al. and Ohishi et al. and further in view of Official Notice. Applicants traverse these pending rejections as set forth below.

Restriction Requirement

In response to a prior restriction requirement, Applicants elected with traverse to prosecute claims 29-43 and 46-56 in Group A, identified by the Examiner as drawn to a species wherein the third amplifier is a Raman amplifier. See Applicants response dated September 25, 2007, pp. 1-2. Non-elected claims 44 and 45 in Group B were identified by the Examiner as drawn to a species wherein the third amplifier is a rare-earth doped fiber amplifier. See *id.*

In the pending Office Action, the Examiner appears to have restricted claims 46-48 for the first time. Applicants have not yet had an opportunity to respond to this

new restriction requirement. Applicants respectfully traverse the restriction of claims 46-48 for at least the reasons below.

First, Applicants submit that the Examiner restricted claims 46-48 on an improper basis. Although the Examiner restricted claims 46-48, it appears that the Examiner has characterized these claims as belonging to the same species that the Applicants elected to prosecute (Group A). More specifically, it appears that the Examiner has characterized claims 46-48 as allegedly being drawn to a species wherein the claimed third amplifier is a Raman amplifier.¹ See Office Action dated November 21, 2007, ¶ 2 (“examiner has withdrawn claims 46-48 because applicant has no disclosure of a Raman amplifier that is co- and counter- pumped”). Regardless of the accuracy of the Examiner’s characterization of claims 46-48, it was improper for the Examiner to restrict claims 46-48 after determining that they fall within the scope of the Applicants’ elected claim group (Group A).

Second, Applicants submit that neither independent claim 29 nor any of its dependent claims 46-48 is limited to a species wherein the claimed “third amplifying stage” is a Raman amplifier, as suggested by the restriction requirement of claims 46-48. Indeed, the word “Raman” does not appear anywhere in any of these claims. Therefore, the Examiner has based the restriction of claims 46-48 on a faulty premise that these claims require “disclosure of a Raman amplifier that is co- and counter-pumped.” *Id.*, ¶ 2.

¹ The Office Action contains a number of statements reflecting characterizations of the claims and related art. Regardless of whether any such statement is identified herein, Applicant declines to automatically subscribe to any statement or characterization in the Office Action.

Finally, Applicants request that the Examiner withdraw the restriction requirement of claims 44-48 for at least the reason that the Examiner has already searched for and applied art corresponding to non-elected Group B, allegedly drawn to a species wherein the third amplifier is a rare-earth doped fiber amplifier. Specifically, the Examiner appears to have equated Applicants' claimed "third amplifying stage" recited in independent claim 29 with rare-earth doped fiber amplifiers 30A and 30B in Evans et al. See Office Action dated November 21, 2007, ¶ 8; see Evans et al., FIG. 1 (showing three amplifier stages 12, 14, and 30A/B); col. 5, l. 42 (disclosing "Erbium doped fiber amplifiers 30A, 30B"). Clearly, it does not make sense to apply art directed to the non-elected species of Group B and, at the same time, maintain that searching for this very species would cause a serious burden. See Office Action dated November 21, 2007, ¶ 4 (Argument C).

Rejections Under 35 U.S.C. § 103(a)

Applicants respectfully traverse the Section 103(a) rejections of pending claims 24-50. To establish a *prima facie* case of obviousness, "All Claim Limitations Must Be Considered." M.P.E.P. § 2143.03 (8th ed., rev. 6, Sept. 2007). More specifically, the M.P.E.P. requires that "[a]ll words in a claim must be considered in judging the patentability of that claim against the prior art." *Id.* (*quoting In re Wilson*, 424 F.2d 1382, 1385 (CCPA 1970)).

Applicants' independent claim 29, as amended, calls for a combination including, for example, "a first amplifying stage including a rare-earth doped optical active fiber," "a second amplifying stage . . . comprising a tellurite-based active fiber doped with a rare earth element," and "a third amplifying stage . . . including a silica-based fiber, wherein

each of said rare-earth doped optical active fiber, said tellurite-based active fiber doped with a rare-earth element, and said silica-based fiber is adapted to amplify signal wavelengths in the C-band and in the L-band." Applicants submit that a *prima facie* case of obviousness has not been established in this case for at least the reason that the art of record, whether taken singly or in combination, fails to teach or suggest at least the claimed first, second, and third amplifying stages "wherein each of said rare-earth doped optical active fiber, said tellurite-based active fiber doped with a rare-earth element, and said silica-based fiber is adapted to amplify signal wavelengths in the C-band and in the L-band," as claimed.

Evans et al., discloses an amplifier system comprising "a distributed Raman fiber amplifier adapted to amplify C and L-band signals" and "a discrete Raman fiber amplifier module that includes a C-band amplification stage and an L-band amplification stage."

Evans et al., Abstract; see also *id.*, col. 2, ll. 23-30; FIG. 1 (showing a distributed Raman fiber amplifier 12 connected to a discrete Raman fiber amplifier module 14). Each of the C-band and L-band amplification stages in the discrete Raman fiber amplifier module 14 includes a respective amplifying fiber 18. See, e.g., Evans et al., FIG. 1. Further, each of the C-band and L-band amplification stages in the discrete Raman fiber amplifier module 14 is connected to a respective C-band or L-band Erbium-doped fiber amplifier 30A or 30B. See *id.*

Because each of the amplifying fibers 18 in Evans et al. is dedicated to amplifying signal wavelengths only in a single optical wavelength band (i.e., the C-band or L-band, but not both), the fiber amplifiers 18 in Evans et al. are not "adapted to amplify signal wavelengths in the C-band and in the L-band," as recited in Applicants'

amended independent claim 29. *See id.*, FIGS. 1 and 4 (showing beam splitter 13 separating an input signal into a C-band signal that is input to a first fiber amplifier 18 in the discrete Raman fiber amplifier 14 and a separate L-band signal that is input to a second fiber amplifier 18 in the discrete Raman fiber amplifier 14).

Similarly, each of the multistage Erbium-doped fiber amplifiers 30A and 30B in Evans et al. is dedicated to amplifying only C-band or L-band signal wavelengths, but not both. *See id.*, col. 5, ll. 27-41 ("Erbium doped amplifier (for example, a C-band dedicated amplifier 30A) . . . [and] L-band Erbium doped fiber amplifier 30B"). For example, as shown in FIGS. 1 and 4 in Evans et al., the Erbium-doped fiber amplifier 30A is dedicated to amplifying only C-band signal wavelengths and the Erbium-doped fiber amplifier 30B is dedicated to amplifying only L-band signal wavelengths respectively output from C-band and L-band amplifying stages in the discrete Raman fiber amplifier 14. *See id.*, FIGS. 1 and 4. As such, the single-band Erbium-doped fiber amplifiers 30A and 30B cannot reasonably be "adapted to amplify signal wavelengths in the C-band and in the L-band," as claimed.

As best understood, it appears that the Examiner has respectively equated the Applicants' claimed first, second, and third amplifying stages with the distributed Raman amplifier 12, discrete Raman amplifier module 14, and Erbium-doped fiber amplifiers 30A and 30B in Evans et al. *See* Office Action dated November 21, 2007, ¶ 8. The Examiner then appears to suggest that it would have been obvious to replace the distributed and discrete Raman amplifiers 12 and 14 in Evans et al. with the silica-based fiber amplifier 204 and tellurite-based fiber amplifier 205 disclosed in Ohishi et al. *See*

id.; see also Ohishi et al., FIG. 31 and ¶¶ 0422-432 (disclosing silica-based fiber 204 and tellurite-based fiber 205).

As noted above, in the Examiner's suggested combination of Evans et al. and Ohishi et al., the Erbium-doped fiber amplifiers 30A and 30B in Evans et al. appear to correspond with Applicants' claimed "third amplifying stage including a silica-based fiber, wherein . . . said silica-based fiber is adapted to amplify signal wavelengths in the C-band and in the L-band," as recited in amended independent claim 29. However, as previously discussed, such a correspondence is improper for at least the reason that the Erbium-doped fiber amplifiers 30A and 30B in Evans et al. are dedicated to amplifying signals in only one of the C-band or L-band, and therefore are not "adapted to amplify signal wavelengths in the C-band and in the L-band," as claimed.

Applicants also point out that, in practice, one of ordinary skill in the art would not connect the Erbium-doped fiber amplifiers 30A and 30B (alleged third amplifier stage) in Evans et al. to the fiber amplifiers 204 and 205 (alleged first and second amplifier stages) in Ohishi et al. for at least the reason that each of the Erbium-doped fiber amplifiers 30A and 30B in Evans et al. receives input signals in a single wavelength band (e.g., C- or L-band signals), whereas the fiber amplifiers 30A and 30B in Evans et al. output signals in multiple bands (e.g., C- and L-bands). As such, the C+L output signals from the fiber amplifiers 204 and 205 in Ohishi et al. would not be separated into constituent C- and L-bands as expected by the Erbium-doped fiber amplifiers 30A and 30B in Evans et al.

The Examiner appears to also suggest a second possible combination of Evans et al. and Ohishi et al. Specifically, the Examiner states that "Evans does

however teach placing any two stage amplifier in place of module 30A and 30B." Office Action dated November 21, 2007, ¶ 8. Even assuming Evans et al. contains such a teaching (which it does not appear to contain)², this statement seems to suggest that Ohishi et al.'s silica-based fiber amplifier 204 and tellurite-based fiber amplifier 205 could replace a pair of amplifier stages in Evans et al.'s multistage Erbium-doped fiber amplifiers 30A and 30B. See Evans et al., col. 5, ll. 41-45; Ohishi et al., FIG. 31. However, such a combination of Evans et al. and Ohishi et al. fails to anticipate or render obvious Applicants' amended independent claim 29, for at least the reasons discussed below.

First, this second suggested combination of Evans et al. and Ohishi et al. would not include a "third amplifying stage," as claimed. Ohishi et al. discloses a tellurite-based fiber amplifier 205 (alleged "second amplifying stage") positioned after a silica-based fiber amplifier 204 (alleged "first amplifying stage"). See, e.g., Ohishi et al., FIG. 31. Therefore, if the silica-based fiber amplifier 204 and tellurite-based fiber amplifier 205 were deployed as consecutive amplifying stages in the Erbium-doped fiber amplifiers 30A/B disclosed in Evans et al., as the Examiner suggests, then the tellurite-based fiber amplifier 205 would be directly connected to a coupler/beamsplitter 13 and not to a "third amplifying stage including a silica-based fiber" as recited in Applicants' amended claim 29. See, e.g., Ohishi et al., FIG. 31 (showing tellurite-based fiber amplifier 205 positioned after the silica-based fiber amplifier 204); Evans et al.,

² Evans et al. discloses that "Erbium doped fiber amplifiers 30A, 30B may be, for example, a multistage amplifiers with amplification stages 32 and 33 and may contain a loss element 34 located therebetween." Evans et al., col. 5, ll. 41-45. However, Evans et al. does not appear to contain any disclosure of "placing any two stage amplifier in place of module 30A and 30B," as suggested in the Office Action.

FIG. 1 (showing the last amplifier stage 33 in the Erbium-doped amplifiers 30A and 30B connected directly to a coupler/beamsplitter 13).

Put another way, substituting Ohishi et al.'s silica-based fiber amplifier 204 and tellurite-based fiber amplifier 205 in place of multiple stages in the fiber amplifiers 30A and 30B in Evans et al. would result in a multi-stage amplifier whereby the tellurite-based amplifying stage is not the second stage, as required by independent claim 29. Rather, in this hypothetical substitution, the tellurite-based amplifier 205 would be the last amplifying stage (i.e., the third or fourth stage depending how stages are counted) that is directly connected to the coupler/beamsplitter 13.

Further, in the Examiner's second suggested combination of Evans et al. and Ohishi et al., the Examiner may argue that the discrete Raman amplifier module 14 (including amplifying fibers 18) in Evans et al. corresponds with Applicants' claimed "first amplifying stage including a rare-earth doped optical active fiber," as recited in amended independent claim 29. However, as discussed above, such an equivalence is improper for at least the reason that each of the amplifying fibers 18 in Evans et al. is dedicated to amplifying signal wavelengths in only one of the C- or L-bands, and therefore is not "adapted to amplify signal wavelengths in the C-band and in the L-band," as claimed.

More generally, Applicants believe that the cited art, whether taken alone or in combination, provides no reason or motivation why C+L band amplifying stages, such as the silica-based fiber 204 and tellurite-based fiber 205 amplifying stages in Ohishi et al., would be placed in a branch of an optical amplifier where only C-band or

only L-band signals are received, such as in the Erbium-doped fiber amplifier stages 30A and 30B in Evans et al.

In view of the foregoing, Applicants respectfully submit that independent claim 29, as amended, is allowable over the Examiner's combination of Evans et al. and Ohishi et al. Dependent claims 30-43 and 49-56 depend on allowable independent claim 29 and are therefore allowable for at least the same reasons.

Conclusion

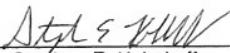
The preceding remarks are based only on the arguments in the Office Action, and therefore do not address patentable aspects of the invention that were not addressed by the Examiner in the Office Action. The claims may include other elements that are not shown, taught, or suggested by the cited art. Accordingly, the preceding remarks in favor of patentability are advanced without prejudice to other possible bases of patentability.

In view of the foregoing amendments and remarks, Applicants respectfully request reconsideration and reexamination of this application and the timely allowance of the pending claims. Please grant any extensions of time required to enter this response and charge any additional required fees to our Deposit Account No. 06-0916.

Respectfully submitted,

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Dated: May 19, 2008

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